

## VICTORIAN MUSCI

## PART 1: INTRODUCTION AND ANDREAEACEAE

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**Abstract**

The study of mosses in Victoria has been long neglected. In this introductory paper some of the problems involved are discussed and a summary of the literature is set forth. The genus *Andreaea* is treated in detail both as to its synonymy and distribution.

**Introduction**

For the student of Victorian mosses there are many difficulties. No handbook is available and the few published lists are both incomplete and unreliable. Since their publication, several generic concepts have changed, and many species are now placed in other genera. This, and the fact that they contain much unindicated synonymy, reduces the value of these older lists.

The most important check-list is the 'Census Muscorum Australiensium' (Watts and Whitelegge, 1902, 1905). Unfortunately this census deals only with the acrocarpous mosses as then known for Australia. The list gives the specific name, the author responsible, the periodical in which the species was described, and certain of the localities from which it had been collected. For the pleurocarpous mosses, we must turn to an old and incomplete list of Australian mosses by Mitten (1883), who prepared a table of all the mosses known by him to come from Australia. An earlier, apparently neglected, article by Muller and Hampe (1853) records several pleurocarpous mosses not enumerated by Mitten. Recently Sainsbury (1946, 1948) and Clifford and Willis (1951) have recorded additional species for the flora. By combining all these records, a reasonably reliable check-list for the State can be prepared.

A check-list is of limited value unless literature is available which will enable species and genera to be determined. The following books and articles are useful references. The best available work for south-eastern Australia is the revision of the New Zealand flora by Dixon (1913-28). Most of the plants described therein are common to both regions. Rodway (1914) has provided a manual for the Tasmanian mosses, and this includes most of the Victorian species. The 'Handbook of the New Zealand Flora' by Hooker (1867) has a good key to the genera. Unfortunately neither of these references is illustrated, but they can be supplemented with the 'Flora Novae-Zelandiae' (Hooker 1855) and the 'Flora Tasmaniae' (Hooker 1860), both of which contain excellent plates. In addition, there is a semi-pictorial key to the Tasmanian mosses (Bastow 1886) and a book of plates by Mueller (1864). The most complete reference is the moss volume of the *Pflanzenfamilien* (Brotherus 1904). It provides a key to the moss families of the world, keys to the genera and partial keys to the species. Although very complete, the key to the families is very difficult and needs careful interpretation. In the second revised edition (Brotherus 1924-25) there is no key to the families.

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Assuming that by these means a species is determined, there is still the problem of whether it is correctly named by present standards. In the interval that has elapsed since the books referred to were written, many alterations have taken place in the delimitation of genera, as is illustrated in Table 1 where the synonyms of *Catagonium politum* (Hk. et W.) Dus. are set out.

The tracing of a species whose specific epithet remains constant is easier than tracing one that goes into synonymy with another species. With the latter situation, only an extensive knowledge of the literature and access to type specimens will solve the problem. Large numbers of synonyms were created in the nineteenth century by bryologists who did not realize the wide distribution and variability of the plants with which they were dealing. In Table 2 the synonymy of *Bryum dichotomum* Hedw. is set out to illustrate this point.

TABLE 1  
*Synonyms of Catagonium politum (Hk. et W.) Dus.*

Species	Reference
<i>Hypnum politum</i> Hk. et W.	Hooker 1867
<i>Acrocratium politum</i> (Hk. et W.) Mitt.	Mitten 1883
<i>Catagonium politum</i> (Hk. et W.) Dus.	Rodway 1914
<i>Eucatagonium politum</i> (Hk. et W.) Broth.	Brotherus 1925

In addition to the general literature mentioned, there are several papers dealing with the systematics of particular groups. Watts (1918) has discussed the Australian species of the genus *Sphagnum*, and Sainsbury in a series of articles in the 'Victorian Naturalist' between April 1932 (vol. 48) and August 1932 (vol. 49) discusses and describes in detail several species. Monographs are available for the genus *Zygodon* (Malta 1923), *Ulota* (Malta 1933) and *Dawsonia* (Burges 1949).

As well as articles concerning systematics there are a few that discuss the cryptogams of selected localities or mention the mosses as constituents of local floras. The best of these papers is by Stirling (1885), who dealt with the cryptogams of the Australian Alps. Others who have published lists are Bastow (1904, '05), Beaglehole (1947), Garnet and Willis (1949), Leslie (1924, '25), Morris (1929), Murdoch (1910), Sullivan (1887), Watts (1905), and Willis (1947).

It is obvious from the foregoing remarks that the moss flora of the State is in need of revision, a task upon which the writer is at present engaged. Every genus must be revised and a full description prepared for each of the species. The time involved will be great, and so it is intended that Part 2 of this series will be a check-list with the nomenclature revised and the synonymy where possible unravelled. In Part 3 the distribution of the mosses within Victoria will be discussed.

TABLE 2  
*The synonymy of Bryum dichotomum Hedw. as it concerns Victorian species*

Species	Synonym
<i>Bryum dichotomum</i> Hedw.	<i>Bryum gambiense</i> C.M.
	<i>B. cupulatum</i> C.M.
	<i>B. pachythecca</i> C.M.
	<i>B. pachytheccoides</i> C.M.
	<i>B. pachypyxis</i> C.M.
	<i>B. subaenum</i> C.M. et Hpe.
	<i>B. sullivanii</i> C.M.
<i>B. annulatum</i> Hk. et W.	

## ANDREAEACEAE

The species of *Andreaea* are dark, varying from black or dark olive-green to red or reddish-brown; only the youngest leaves show the presence of chlorophyll. The older leaves are invariably reddish-brown when viewed with transmitted light as when examined under the microscope. In the upper portion of the leaf the cells are rounded or slightly angular, but towards the leaf base they are rectangular with sinuose walls. Little significance can be placed upon the papillosity of the cell wall, because it is very variable. The capsule is elevated not upon a seta but a pseudopodium, a structure morphologically resembling a seta. There is no peristome, the capsule opening along four valves separated by vertical slits. The valves may be united at their tips but are rarely found in this condition. A columella is present and persists in the mature capsule.

As with many other mosses the genus *Andreaea* has a characteristic habitat. From the descriptions in the standard floras, an impression is gained that *Andreaea* species grow 'in tufts or cushions on non-calcareous rocks of mountainous or frigid zones' (Sharpe 1936). Brotherus (1924) adds that in the arctic regions the genus may grow upon the earth. Until recently it was presumed that the Victorian members of the genus occupied habitats in keeping with this description. Plants have been collected from the Australian Alps and Mount Wellington (Watts and Whitelegge 1902). Both localities are about 5000 ft. and are locally regarded as alpine or sub-alpine.

Within the last two years collectors have gathered plants of the genus from the low altitude of approximately 2000 ft. In each instance the habitat was sandstone rocks within dry sclerophyllous forests. The localities are hot and dry in summer, whilst in winter, although frosts are common, snow falls are rare. Such a habitat is not in agreement with that given in the standard floras, most of which were written in the northern hemisphere. Were it not for Rodway's notes on the Tasmanian mosses (1914) it might be thought that the descriptions of the habitat from northern latitudes did not apply in southern latitudes. But Victoria is not the only place where this seemingly atypical behaviour is found, for the type collection of *A. subulata* Harv. (1840) was from the top of Table Mountain, South Africa, where the summers are also hot and dry.

Certain of the synonyms and the local distributions of the Victorian species are set out in Table 3. Three species are recorded for the State, but none is endemic. According to Martin (1946), *A. rupestris* Hedw. is cosmopolitan, *A. subulata* Harv. is circumpolar in the southern hemisphere, and *A. australis* Mitt. is restricted to Australia, Tasmania and New Zealand. On the Australian mainland these three species are also found in New South Wales. The genus has not yet been recorded from any of the other States.

TABLE 3

*The distribution and synonymy of the Victorian species of the genus Andreaea*

Species	Synonymy	Localities
<i>A. rupestris</i> Hedw.	<i>A. asperula</i> Mitt.	Bogong High Plains
	<i>A. petrophila</i> Ehrh.	Cathedral Range
	<i>A. muelleri</i> Sond.	Grampians
	<i>A. julicaulis</i> C.M.	Mount Buffalo Mount Macedon Baw Baws Mount Kaye

<i>A. australis</i> Mitt.		Mount Wellington
<i>A. subulata</i> Harv.	<i>A. subulatissima</i> C.M.	Bogong High Plains Grampians Mount Buffalo Baw Baws

**Description of Species**

*Andreaea rupestris* Hedw. Spec. Muscorum 1801.

Syns.: *A. petrophila* Ehrh. in Hann. Mag., 1784; *A. asperula* Mitt., Journ. Linn. Soc., vol. 4, 1860; *A. muelleri* Sond., apparently a ms. name; *A. julicaulis*, C. M. Hedwigia, vol. 37, 1898.

The size of the plants (Figs. 3, 3a, 4) is variable from a few mm. to several cm. tall, either densely caespitose or laxly procumbent; sparingly branched. The leaves are concave, ovate to ovate-lanceolate; leaf tip obtuse or occasionally acute. Towards the ends of the branches the leaves are falcato-secund. Nerve absent. Perichaetial leaves differentiated, convolute, obtuse or with a short apiculus.

The writer has suggested that *A. asperula* Mitt. is a synonym of *A. rupestris* Hedw. because after examining a portion of the collection from which the species was named he can see no differences that exclude it from the latter species. However, no absolute decision can be made until Mitten's herbarium is examined, for there may be another plant mixed in with the portion sent to him.

*Andreaea australis* Mitt. Jour. Bot., vol. 8, 1856.

In habitat *A. australis* Mitt. (Figs. 2, 2a) resembles robust forms of *A. rupestris* Hedw., but differs from that species in possessing a well developed nerve to the leaf and only slightly differentiated perichaetial leaves. The species is imperfectly known in Victoria, having been collected only by Mueller, F. von, who gathered the material from which the type description was prepared.

*Andreaea subulata* Harv. Icones Plantarum, vol. 3, 1840.

Syn.: *A. subulatissima*, C. M. Hedwigia, vol. 37, 1898.

*A. subulata* Harv. (Figs. 1, 1a) has a habit similar to the previous species but its leaves are quite a different shape. They are broad at the base and contract sharply to a narrow subula. The subula is almost wholly made up of nerve and was described originally as nerveless. At the base of the leaf the nerve is quite conspicuous. The perichaetial leaves are strongly differentiated, convolute, and obtuse or rarely acute.

KEY TO SPECIES

Leaves ligulate, contracting from a broad base	..	..	..	..	<i>A. subulata</i>
Leaves ovate or ovate-lanceolate	..	..	..	..	<i>A.</i>
<i>A.</i> Leaves nerveless	..	..	..	..	<i>A. rupestris</i>
Leaves nerved	..	..	..	..	<i>A. australis</i>

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Fig. 1—Typical plant of *A. subulata* Harv. Fig. 1a—Leaf of *A. subulata* Harv.  
 Fig. 2—Typical plant of *A. australis* Mitt. Fig. 2a—Leaf of *A. Australis* Mitt.  
 Fig. 3—Erect form of *A. rupestris* Hedw. Fig. 3a—Leaf of erect form of *A. rupestris* Hedw.  
 Fig. 4—Procumbent form of *A. rupestris* Hedw.